

REMARKS

Applicants thank the Examiner for total consideration given the present application. Claims 1-20 were pending prior to the Office Action. Claims 4-16 and 18-20 have been cancelled and claims 21-24 have been added through this Reply. Thus, claims 1-3, 17, and 21-24 are currently pending of which claims 1, 17, 21 and 24 are independent. Claims 1, 3, and 17 have been amended through this Reply. Applicants respectfully request reconsideration of the rejected claims 1-3 and 17 in light of the amendment and remarks presented herein, and earnestly seek timely allowance of all pending claims.

FORM 1449 ACKNOWLEDGMENT REQUESTED

In response to the Examiner's objection to the Information Disclosure Statement, an English translation of the non-patent literature and a copy of JP-2611555 (with English translation of the Abstract) have been provided herewith. Thus, another initialed copy of the PTO-1449 filed July 11, 2006 for the present application is earnestly solicited.

APPLICANT ADMITTED PRIOR ART

Initially, it is respectfully submitted that the Examiner's characterization of the background section as "applicant's admitted prior art" is totally erroneous. Applicants do not admit that the section under the heading "Background" is "Prior Art". Applicants submit that the section under the heading "Background" provides some examples of background art that may be relevant.

35 U.S.C. § 103 REJECTION – AAPA, Maeda, Popescu

A. Claims 1, 2, and 17 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Applicants' Admitted Prior Art [hereinafter "AAPA"] in view of Maeda et al. (U.S. Patent No. 6,072,910)[hereinafter "Maeda"]. Applicants respectfully traverse.

Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness. To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Additionally, there must be a reason why one of

ordinary skill in the art would modify the reference or combine reference teachings to obtain the invention. A patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. *KSR Int'l Co. v Teleflex Inc.*, 82 USPQ2d 1385 (U.S. 2007). There must be a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does. *Id.* The Supreme Court of the United States has recently held that the "teaching, suggestion, motivation test" is a valid test for obviousness, albeit one which cannot be too rigidly applied. *Id.* Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *Id.*

In this instance, it is respectfully submitted that neither AAPA nor Maeda, alone or in combination, teaches or suggests all claim limitations.

For example, independent claim 1 recites, *inter alia*, "a predicted reference value generator receiving the image signal, and generating a predicted reference value of each image frame from DC components obtained by orthogonal transformation of left-edge blocks of the image frame . . . carries out quantizing and variable-length encoding of the predicted reference value to be added to a header, and outputs the encoded AC components and difference values along with the encoded predicted reference value added to the header as a bit stream."
(Emphasis added.)

The Examiner acknowledges that AAPA, among other features, fails to teach or suggest the above-noted feature of independent claim 1. Thus, the Examiner imports Maeda to fulfill the above-noted deficiency of AAPA. It is respectfully submitted that Maeda fails to fulfill the deficiency of AAPA.

The invention of the present application is directed to encoding a difference between a predicted reference value calculated adaptively and DC components of blocks. As mentioned in the "Background" section of the instant specification, according to MPEG-2 as an encoding type described in "MPEG", it possesses a concept of coding a difference between a predicted value and a DC component of a block. A predicted value used for this coding type is calculated from

adjacent block(s), however, a predicted value of the first block in a slice unit is applied a fixed value (i.e. 'reset of the predicted value' taught in "MPEG").

On the other hand, Maeda does not possess the concept of encoding a difference between a predicted value and a DC component of a block. Maeda is directed to a conventional coding apparatus which divides digital image information into pixel blocks each having a size of mxn pixels, and subjects the image information to vector quantization in block units. More specifically, the pixel blocks are orthogonally transformed and the characteristics and sequency components of the pixel blocks are detected. Each pixel block is divided into a plurality of sub-blocks in conformity with the detected sequency components. Respective ones of the plurality of divided and outputted sub-blocks are scalar-quantized into sub-vectors of a predetermined number of bits in conformity with the characteristics of the pixel blocks. Respective ones of the scalar-quantized values of the quantized sub-blocks are vector-quantized in conformity with the characteristics of the pixel blocks, these vector-quantized reproduction vector codes are combined and the result is subjected to further vector quantization. (*See Abstract.*)

Again, it is respectfully submitted that Maeda does not possess the concept of encoding a difference between a predicted value and a DC component of a block. In other words, Maeda does not teach or suggest a predicted reference value generator that generates a predicted reference value of each image frame from DC components obtained by orthogonal transformation of left-edge blocks of the image frame. Rather, as demonstrated above, Maeda discloses a coding apparatus that utilizes a correlativity of image data to perform vector quantization with a look-up table (LUT). The Examiner relies on col. 9, line 45 – col. 10, line 9 of Maeda as disclosing the above-identified feature of claim 1. (*See page 5, last paragraph of the Office Action.*) It is respectfully submitted that the Examiner's interpretation of the relied upon section of Maeda is totally erroneous.

The relied upon section of Maeda is directed to a conventional class sorting method in which multistage vector quantization is carried out. For example, in case of image data having a steep edge in the vertical direction, a large sequency component (power) concentrates in the shaded portion shown in FIG. 4B. Similarly, a large sequency component concentrates in the

shaded portion shown in FIG. 4C in case of image data having a steep edge in the horizontal direction of the image data, and a large sequency component concentrates in the shaded portion shown in FIG. 4D in case of image data having a steep edge in the diagonal direction of the image data. In Maeda, an inputted image block is sorted into one of these four classes and the blocks are independently vector-quantized. (See col. 9 line 58 – col. 10, line 9.)

Further, Maeda discloses that in the case where the orthogonally transformed block has the vertical edge of FIG. 4B (class 2), the block is divided into bands, as shown in FIG. 5. Among these, a DC component is scalar-quantized independently and the other four bands are vector-quantized independently, thereby making it possible to achieve construction using the LUT arrangement. (See col. 10, lines 14-20.)

The prediction error according to "MPEG", Maeda, and the present application could be expressed as follows:

The present application:

$$Diff_q = Q(DC - DC_{std})$$

"MPEG":

$$Diff_q = Q(DC - DC_{const}) \dots \text{for the first block in a slice unit;}$$

$$Diff_q = Q(DC - DC_{pred}) \dots \text{for blocks except the first block}$$

Maeda:

$$Diff_q = Q(DC)$$

Diff_q : prediction error found after quantization (i.e. an object to be encoded)

Q() : quantization

DC : DC component

DC_{std} : predicted reference value (to be generated by using left-edge blocks)

DC_{const} : fixed value as a predicted value used for the first block in a slice unit

DC_{pred} : predicted value

A table of VLC (Variable-length Coding) for image coding is formed in a manner where a shorter bit string is allocated to a smaller value (as shown in Chart 5.18 of "MPEG"). Thus, efficiency on encoding is enhanced if a value of Diff_q would be a small value. The invention of the present application intends to make a value of Diff_q smaller by using DC_{std} which is adaptively generated. Thus, the claimed invention recites, *inter alia*, "a predicted reference value is generated from DC components obtained by orthogonal transformation of left-edge blocks of the image frame."

The combination of AAPA and Maeda does not teach or suggest above-noted feature of the claimed invention. As demonstrated above, in Maeda, after obtaining a DC component by orthogonal transformation, such DC component is scalar-quantized. Thus, only a quantized value of the DC component will be generated which would be required to achieve construction using the LUT. A predicted reference value is not generated from the DC component.

Conversely, in the claimed invention first a predicted reference value is generated from DC components obtained by orthogonal transformation of left-edge blocks of the image frame and then the encoding apparatus carries out quantizing and variable-length encoding of the predicted reference value to be added to a header, and outputs the encoded AC components and difference values along with the encoded predicted reference value added to the header as a bit stream." (*Emphasis added.*)

Thus, according to the claimed invention it is possible to provide a highly efficient image encoding when encoding the first block or a block with weak correlation with neighboring blocks.

At least in view of the above, Applicants respectfully submit that the asserted combination of AAPA and Maeda (assuming these references may be combined, which Applicants do not admit) fails to establish *prima facie* obviousness of claim 1 or any claim depending therefrom.

Independent claim 17 is directed to a decoder which recites, *inter alia*, "decoding a predicted reference value of each image frame generated from DC components of left-edge blocks of the image frame added to a header." As demonstrated above in great detail, none of

AAPA and Maeda teaches or suggests the above-identified feature. Thus, at least for the same reasons stated with respect to claim 1, the asserted combination of AAPA and Maeda (assuming these references may be combined, which Applicants do not admit) fails to establish *prima facie* obviousness of claim 17.

Accordingly, it is respectfully requested to withdraw the rejection of claims 1, 2, and 17, based on AAPA and Maeda.

B. Claims 3 is rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over AAPA in view of Maeda, and further in view of Pesquet-Popescu (U.S. Patent No. 6,519,284)[hereinafter "Popescu"]. Claim 3 depends from claim 1. As demonstrated above in great detail, the combination of AAPA and Maeda fails to teach or suggest, *inter alia*, "a predicted reference value generator receiving the image signal, and generating a predicted reference value of each image frame from DC components obtained by orthogonal transformation of left-edge blocks of the image frame . . . carries out quantizing and variable-length encoding of the predicted reference value to be added to a header, and outputs the encoded AC components and difference values along with the encoded predicted reference value added to the header as a bit stream" as recited in claim 1. Popescu has not been, and indeed cannot be, relied upon to fulfill the above-noted deficiency of AAPA and Maeda. Thus, at least for this reason, it is respectfully requested to withdraw the rejection of claim 3, based on AAPA, Maeda, and Popescu.

New Claims

New method claims 21-24 correspond to apparatus claims 1-3 and 17, respectively. Thus, at least for the reasons presented with respect to claims 1-3 and 17, claims 21-24 are also allowable over AAPA and Maeda.

CONCLUSION

All rejections raised in the Office Action having been addressed, it is respectfully submitted that the present application is in condition for allowance. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be

exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claims does not necessarily signify concession of unpatentability of the claim prior to its amendment.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Ali M. Imam Reg. No. 58,755 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

By 
Michael K. Mutter
Registration No.: 29,680
BIRCH, STEWART, KOLASCH & BIRCH, LLP
8110 Gatehouse Road
Suite 100 East
P.O. Box 747
Falls Church, Virginia 22040-0747
(703) 205-8000
Attorney for Applicants

Attachments: English translation of the NPL
JP-2611555 and its English language abstract